

South Carolina Grid Improvement Plan Report
Duke Energy Carolinas
Capital Expenditures 2019 - 2021

Program	Cumulative Target	Units	Cumulative Actuals	Units	Cumulative Variance	Units	Program Notes
1 Self Optimizing Grid	\$ 65,563,000		\$ 56,745,827		\$ (8,817,173)		
Segmentation and Automation	\$ 18,951,000	297	\$ 23,580,646	435	\$ 4,629,646	138	Program executed more work at lower unit cost.
Modular Distrib Control Device POC	\$ 58,000		\$ 587		\$ (57,413)		Changed the approach to deploying the functionalities in this program to keep protection and automation separate for safety reasons.
Capacity & Connectivity	\$ 19,385,000	49	\$ 19,176,419	49.0	\$ (208,581)	-	Program executed as anticipated.
Substation Bank Capacity	\$ 18,736,000		\$ 5,243,997		\$ (13,492,003)		Program required less substation capacity work to support self-optimizing grid.
Advanced DMS	\$ 8,433,000		\$ 8,744,179		\$ 311,179		Program executed as anticipated.
2 Distribution Hardening & Resiliency - Flood	\$ -		\$ -		\$ -		
3 Distribution Transformer Retrofit	\$ -		\$ -		\$ -		
4 Integrated Volt/Var Control	\$ 43,605,000		\$ 29,487,914		\$ (14,117,086)		
Circuits		256		117		(139)	Execution phase of the program delayed due to additional technical planning, engineering, pre-work, and resource constraints. Program making significant progress on installing circuit equipment in preparation for voltage reduction, civil construction, control house panel installation and telecom installations.
Substations		43		15		(28)	
5 Transmission Hardening & Resiliency	\$ 23,800,000		\$ 15,822,471		\$ (7,977,529)		Program largely focused on 44kV line rebuilds. Less work executed due to timeline and complexity associated with land acquisition and permitting of rights-of-way.
6 Transmission Bank Replacement	\$ 7,125,000		\$ 7,412,704		\$ 287,704		Program executed as anticipated.
7 Transmission System Intelligence	\$ 16,676,250		\$ 13,194,515		\$ (3,481,735)		Some program work was executed in the oil breaker replacement program.
8 Oil Breaker Replacement	\$ 6,111,000		\$ 9,168,839		\$ 3,057,839		Program executed more work to the achieve reliability and environmental improvements for customers. Some system intelligence work was also included in the program.
Distribution Breaker Replacements	\$ 2,464,000		\$ 2,525,847		\$ 61,847		
Transmission Breaker Replacements	\$ 3,647,000		\$ 6,642,992		\$ 2,995,992		
9 Targeted Undergrounding	\$ 19,675,000	40	\$ 22,306,369	19.5	\$ 2,631,369	(20.5)	Costs are higher than plan. Actuals reflect unique nature of each neighborhood project tailored to specific property needs including easement acquisition, engineering, interferences, location, terrain, etc.
10 Long Duration Interruptions	\$ 12,967,000		\$ 17,787,048		\$ 4,820,048		Executed more work in this program for the reliability benefits to customers.
11 Enterprise Communications	\$ 25,282,399		\$ 30,437,579		\$ 5,155,180		
Next Generation Cellular	\$ 932,471	1,264	\$ 1,683,651	933	\$ 751,180	(331)	Program costs were higher than anticipated.
Mission Critical Voice	\$ 4,031,064		\$ 1,574,884		\$ (2,456,180)		Program was delayed for additional planning and design.
BizWAN	\$ 87,935		\$ 7,761		\$ (80,174)		This work was combined with networking efforts under our Telecommunications program and removed from the SC GIP.
GridWAN	\$ 3,721,705	52	\$ 3,123,846	50	\$ (597,859)	(2)	Program executed as anticipated.
Mission Critical Transport	\$ 12,230,371	59	\$ 18,258,025	130	\$ 6,027,654	71	Program executed more work than anticipated including fiber miles, microwave sites, optical sites and MAS radio sites.
Towers Shelters Power Support	\$ 2,853,569	5	\$ 4,672,059	6	\$ 1,818,490	1	Program cost include power supply work that is not reflected in the units in the plan.
Network Asset System Tools	\$ 159,238		\$ 128,167		\$ (31,071)		Project executed as anticipated.
Vehicle Area Network	\$ 1,266,046	2,979	\$ 989,187	477	\$ (276,859)	(2,502)	Telematics portion of the VAN program completed available units. Wifi portion was delayed to evaluate technology options.
12 Distribution Automation	\$ 19,049,000		\$ 30,652,076		\$ 11,603,076		
Hydraulic to Electric Recloser	\$ 12,932,000	197	\$ 12,615,393	253	\$ (316,607)	56	Program executed more work for less cost.
System Intelligence & Monitoring	\$ 1,297,000		\$ 27,985		\$ (1,269,015)		Program is delayed due to additional scoping and design, and schedule is dependent on completion of prescale work.
Fuse Replacement w/ Reclosers	\$ 2,510,000	475	\$ 4,582,976	558	\$ 2,072,976	83	Program executed more work than anticipated.
Underground System Automation	\$ 2,310,000	28	\$ 13,425,722	12	\$ 11,115,722	(16)	Program work increased to include duct bank infrastructure, primary circuit extensions, and fiber network for switchgear relays for SCADA and self-healing capabilities. Infrastructure work required before construction of vaults.
13 Enterprise Applications	\$ 5,346,000		\$ 3,085,859		\$ (2,260,141)		Program contained less work than anticipated.
Integrated Tools for Outage Apps	\$ 390,000		\$ 445,765		\$ 55,765		
TUG System Software Tools	\$ 44,000		\$ 87,105		\$ 43,105		
Health Risk Management	\$ 946,000		\$ 1,306,466		\$ 360,466		
Enterprise Distribution System Health	\$ 26,000		\$ 89,326		\$ 63,326		
Other Initiatives	\$ 3,940,000		\$ 1,157,197		\$ (2,782,803)		
14 Integrated System Operations Planning	\$ 4,837,000		\$ 1,318,199		\$ (3,518,801)		Program executed for less than anticipated cost.
15 DER Dispatch Enterprise Tool	\$ 2,926,000		\$ 100,849		\$ (2,825,151)		Program delayed for additional planning and design.
16 Power Electronics for Volt/Var	\$ 1,355,000		\$ 260,735		\$ (1,094,265)		Program was delayed due to planning and technical challenges. Installation anticipated to begin in 2022.

17	Physical and Cyber Security - Transmission	\$ 30,213,250	\$ 32,402,982	\$ 2,189,732	Program executed as anticipated.
18	Physical and Cyber Security - Distribution	\$ 7,700,607	\$ 1,804,357	\$ (5,896,250)	Program cancelled to prioritize work that provides evolving risk reduction.
	Device Entry Alert System	\$ 187,098	\$ 54,328	\$ (132,770)	Program executed as anticipated.
	Secure Access Device Management	\$ 740,049	\$ 912,052	\$ 172,003	Program contained less work than anticipated.
	Line Device Protection	\$ 6,773,460 154	\$ 837,977 51	\$ (5,935,483) (103)	
Distribution Total		\$ 208,306,006	\$ 193,986,813	\$ (14,319,193)	
Transmission Total		\$ 83,925,500	\$ 78,001,510	\$ (5,923,990)	
Total Grid Improvement Plan		\$ 292,231,506	\$ 271,988,323	\$ (20,243,183)	

Notes:

1. The Communications Mission Critical Transport program installed 77 miles of fiber, 52 microwave sites, two optical sites, and five MAS radio sites. The Tower Shelter Power Supplies program installed six tower/shelter sites and 28 power supply sites.
2. The GIP deferral does not include Energy Storage and Electric Vehicle work that was included in the original Grid Improvement Plan.